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the inspector of mines is largely statistical. The supervisor of natural gas outlines improvements for the abuses now allowing unnecessary waste of a valuable resource. The major portion of the volume is upon the stratigraphy and paleontology of the Cincinnati series. The smaller alternation of shale with limestone in the Cincinnati beds is attributed to climatic conditions while the sudden change of fauna and type of sediment is attributed to epirogenic causes. The Richmond of Indiana is considered the time equivalent of the Medina of New York. A complete résumé of the fossils described from the series is given.

C. J. H.

Wisconsin Geological and Natural History Survey. E. A. BIRGE, Director, and L. S. SMITH. Bulletin No. XX. Economic Series, No. 13. Water Powers. 354 pp., 52 pls. Madison, 1908.

After a brief description of the physical geography of the state, the author divides the work into two parts: the first dealing specifically with the water-power resources of northern Wisconsin, and the second with those of southern Wisconsin.

C. J. H.

Waste of Our Fuel Resources. Address of DR. I. C. WHITE, State Geologist of West Virginia, at the Conference on the Conservation of Natural Resources, held at the White House on the afternoon of May 13, 1908.

The extent of the large deposits of coal, petroleum, oil, and gas is briefly stated. The wanton waste of them is characterized in a forceful manner. Our industrial rivals—France, Germany, and Great Britain—have no supply of the purest of fuels, natural gas, of which there are wasted in the United States 1,000,000,000 cubic feet daily, the equivalent of 1,000,000 bushels of coal. For every barrel of oil taken from the earth ten times its amount has been lost one-half of which may be saved. From 40 per cent. to 70 per cent. of the coal is irretrievably lost in mining.

C. J. H.

Oklahoma Geological Survey. BY CHAS. N. GOULD, Director, L. L. HUTCHISON and GAYLORD NELSON. Preliminary Report on the Mineral Resources of Oklahoma. Bulletin No. 1, 1908. 88 pp., 11 figs. Norman, 1908.

This bulletin is the first report of the recently formed state geological survey. Its purpose is to direct attention to the vast resources, to foster

home industries, and to discourage useless prospecting. The enormous deposits of coal, gypsum, asphalt, salt, oil, gas, shale, limestone, and clay are described, and their approximate locations given. Lead, zinc, granite, gabbro, porphyry, marble, tripoli, novaculite, and volcanic ash are important deposits. Iron and copper are too widely disseminated in the rocks to be of value. Gold and silver are not likely to be found. The gypsum and asphalt deposits are among the largest in the United States. The granite and porphyry are of the finest quality. The introduction of better means of transportation will stimulate the mineral industry of Oklahoma.

C. J. H.

Some Problems of the Formation of Coal. BY DAVID WHITE. Reprinted from *Economic Journal*, Vol. III, No. 4, 1908.

The author states that typical coal plants grew in greatest profusion under a humid and equable, though not necessarily tropical, climate. The size and state of preservation of delicate plants is affirmative evidence of accumulation in regions of growth. Transported plant remains are characterized by their macerated condition.

Anaerobic bacteria are primarily indispensable as an agency in the decomposition of organic matter, forming algal, fundamental matter, or sapropel. The process which is essentially bio-chemical probably leads no further than the formation of peats, humus, sapropelic deposits, etc. In the dynamo-chemical stage of coalification the anthracites, bituminous coals, and lignites are metamorphosed from peats, lignites, etc. Devolatilization, the writer believes, is caused not by folding or faulting, but by deep-seated horizontal thrust movements. Lithification and partial dehydration are attributed to loading pressure. De-oxygenation and de-hydrogenation which are essentially chemical results are due rather to bio-chemical changes than to dynamic stress.

In a future paper the writer hopes to show clearly that de-oxygenation is a true index of the progress made in the formation of coal and its efficiency as a fuel.

C. J. H.